

HOSTS OF INSECT EGG-PARASITES IN NORTH AND SOUTH AMERICA. II.<sup>1</sup>

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The additional records of the hosts of insect egg-parasites in North and South America given beyond, comprise those overlooked previously (Girault, 1907) and those recorded in the literature during the years 1907 to 1910, besides a few as yet unrecorded which are marked with an asterisk in the list to follow. This paper should be considered as a sequel to the first one, and the same arrangements hold here.

Our knowledge in regard to the hosts of hexapod egg-parasites is increasing rapidly, but as far as is yet known, no true insect egg-parasites are other than hymenopterous<sup>2</sup> and I have but two additional groups to add to those given in 1907 (pp. 28-29), namely the Tetrastichini and Miscogasterini of the Chalcidoidea<sup>3</sup>; the former group may prove to be hyperparasitic on the primary egg-parasites but certainly not always. *Pentarthron minutum* (Riley) still maintains the lead as our most prominent, common and widespread parasite of the eggs of insects, having to date been recorded from thirty or more hosts in North America as well as from several species of the pyralid genus *Omiodes* (*meyricki* Swezey, *blackburni* [Butler], *accepta* [Butler]) in the Hawaiian Islands, where it was introduced by Albert Koebele about 1900 (Swezey, 1907, pp. 46-47); also in Java it attacks *Diatraea striatalis*, and in New Zealand, *Carpocapsa pomonella* Linn. With one or two exceptions, its hosts are all insects of the first economic importance, such as the codling moth, the cotton bollworm, the cotton-leaf caterpillar, the brown-tail moth, the West Indian sugarcane borer and so on. It still confines itself to the Lepidoptera

<sup>1</sup>Part I appeared in *PSYCHE*, Vol. XIV, pp. 27-39.

<sup>2</sup>I am aware of the following sentences of Aaron (1890): "Finally, we must consider the enemies of the Odonata. In the egg state we have found a small red mite, an Arachnid, which skims rapidly over the water in search of an Odonat egg, upon which it either deposits an egg or excavates it for immediate nourishment. A minute Dipteran, genus unknown, was also seen to oviposit on the egg of *Diplax*." I know of a true dipterous parasite on *Fidia* eggs, observed by Mr. Paul R. Jones of the Bureau of Entomology, but unfortunately not reared to maturity. See Johnson and Hammar, 1910, pp. 55-57, fig. 26. As yet, however, no definite records of true dipterous egg-parasites are known to me.

<sup>3</sup>Also perhaps the *Pediobiini* of the *Entedoninae*.

and Hymenoptera. *Phanurus tabanivorus* Ashmead is now known to attack Tabanidæ other than *Tabanus atratus* Fabr., probably some other species of the same genus or *Chrysops flavidus* Wied. (Hine 1907.) The genus *Aphanogmus* Thomson, recorded from the eggs of *Tibicen septendecim* (Linn.), is most probably not an egg-parasite but a larval parasite of Cecidomyidæ (cf. Ashmead, 1893, p. 451; Chittenden, 1909, p. 6) especially since Marlatt (1907, p. 129) records predaceous larval Cecidomyids on the eggs of the periodical cicada, and since the subfamily to which the genus belongs is usually parasitic on the larvæ of Diptera. The records of *Aphanogmus floridanus* Ashm. from the eggs of the *Cicada* appear to be based on a supposition.

Of the insect hosts of the egg-parasites, one order, Platyptera, is added to those previously given (Girault, 1907, p. 29), while definite, previously overlooked, records concerning the Odonata are included. Of the hosts known to be parasitized, the parasite unknown, mention may be made of *Cecidomyia* (?) *foliora* Russell and Hooker (1908); *Notolophus osleri* Barnes in Colorado (Hopkins, 1907, p. 143); *Malacosoma californica* (Pack.) and *M. constrictor* (Stretch) (Isaacs, 1905, p. 102); *Craponius inæqualis* (Say) (Brooks, 1906, p. 240). In passing, I wish to question the record of the eulophid parasites (*Pediobius* gen. et sp. nov. *Tetrastichina*) recorded from the eggs of *Eriocampoides limacina* Retzius by Lawrence (1904); entedonines and tetrastichines are often reared from minute leaf-miners, cecidomyids and the like and none of the records so far concerning this host are free from suspicion in respect to the presence of these incidental hosts.<sup>1</sup> *Westwoodella* Ashmead is parasitic on jassid eggs in the stems of grasses.

Subsequently, the scope of the list will be enlarged to include the world, as it is impossible to ignore the fact that geographical boundaries mean but little in this connection.

Secondary parasitism with egg-parasites was certainly but little known up to several years ago. I had often wondered why this phenomenon did not occur. Several cases are now on record, and even tertiary parasitism, now, is also known to occur.

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<sup>1</sup>However, in regard to this, compare the record of a *Closterocerus* from the same host as given below. The *Pentarthron* was reared at the same time and the former may be secondary, its host the latter species. I think both are primary, however.

## HOSTS AND THEIR PARASITES.

## COLEOPTERA.

HOST.	PARASITE.	AUTHORITY.
<i>Attelabus analis</i> Illiger	<i>Poropæa attelaborum</i> Girault	Girault, MS. notes 1910, (U. S. N. M.).
<i>Calligrapha bigsbyana</i> Kirby	<i>Erigestus winnemana</i> Crawford	Crawford, 1910, p. 88.
<i>Calligrapha scalaris</i> Lec.	<i>Erigestus winnemana</i> Crawford	Crawford, 1910, p. 88.
<i>Crioceris asparagi</i> Linn.	<i>Tetrastichus asparagi</i> Crawford	Crawford, 1909 <sup>a</sup> , p. 150.
<i>Galerucella luteola</i> Müll.	<i>Tetrastichus xanthomelanae</i> Rondani <sup>1</sup>	Howard, 1908, p. 281; fig. 7. Marlatt, 1908, p. 4.
<i>Tyloderma forcolatum</i> Say	<i>Anaphoidea sordidata</i> Girault	Girault, 1909 <sup>b</sup> , p. 171.

In the *Colcoptera*, page 29 of the first part of the list, the following changes have become necessary:

*Anaphes conotracheli* read *Anaphoidea conotracheli*.

*Brachista fidiæ* read *Lathromeris fidiæ*.

*Tachypterus* read *Tachypterellus*.

## HEMIPTERA.

HOST.	PARASITE.	AUTHORITY.
<i>Aphis pomi</i> Dr. Geer	? <i>Anagrus spiritus</i> Girault	Girault, MS. notes, 1909, (C. P. Gillette).
<i>Balclutha impicta</i>	<i>Abbella subflava</i> Girault	Id. (F. M. Webster).
<i>Brochymena obscura</i>	? <i>Trissolcus euschisti</i> Ashm.	Cockerell, 1897, p. 26.
<i>Ceresa bubalus</i> Fabr.	* <i>Gonatocerus dolichocerus</i> Ashm. MS.	Girault, MS. notes, 1911, (U. S. N. M.).
<i>Ceresa taurina</i> Fitch	<i>Ittys ceresarum</i> Ashm.	Girault MS. notes, Illinois, 1908.
	<i>Polynema striaticorne</i> Girault	Girault, MS. notes, 1910, (N. Y. Exp. Sta.).
<i>Dorycephalus platyrhynchus</i> Osborn	? <i>Oligosita americana</i> Ashm.	Girault, 1909 <sup>a</sup> .
<i>Enchenopa binotata</i> Say	* <i>Gonatocerus</i> species	Girault, MS. notes, 1908, (J. J. Davis).
	<i>Polynema enchenopæ</i> Girault	Girault, MS. notes, 1908, (J. J. Davis).
	<i>P. consobrinus</i> Girault MS.	
<i>Euschistus servus</i> Say	<i>Telenomus ashmeadi</i> Morrill <sup>2</sup>	Morrill, 1907, p. 421.
<i>Thyantha custator</i> Fabr.	<i>Telenomus ashmeadi</i> Morrill <sup>2</sup>	Morrill, 1907, p. 421.
<i>Tibicen septendecim</i> Linn.	4 chalcidoids (3 new to the host).	Marlatt, 1907, pp. 130-131.

<sup>1</sup> Introduced artificially from Europe. This may be (Tetracampe) *Tetrastichus galleruæ* (Boyer de Fonscolombe). Rondani did not describe a species called *xanthomelana* but in 1877 listed and figured *Oömyzus galleruæ* Fonscolombe, but his figures do not agree with those of Howard (1908). However, Marchal (1905) discusses this point and the suggestion is given here without study.

<sup>2</sup> In laboratory.

In the *Hemiptera*, pages 30–31 of the first part of the list, the following changes have become necessary:

*Anastatus giraulti* Ashmead is a *Nomen nudum*.

*Trichogramma cerasarum* read *Ittys cerasarum*.

*Polynema* (*Cosmocoma*) sp. nov. read *Polynema striaticorne* Girault.

*Coccus hesperidum* Linnæus—The parasite *Trichogramma flavum* Ashmead listed under this host is an unknown Aphelinine, thus doubtless not an egg-parasite; the record should be expunged.

*Homalodisca triquetra* Fabricius—The parasite *Oöctonus homalodiscæ* Ashmead is a *nomen nudum*.

## HYMENOPTERA.

HOST.	PARASITE.	AUTHORITY.
<i>Cimber americana</i> Leach.	<i>Pentarthron minutum</i> Riley	Severin and Severin, 1908, pp. 68–70.
	<i>Nesomyia cimbicis</i> Brues	Brues, 1908, p. 162.
<i>Eriocampoides limacina</i> Retzius	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1909, (R. L. Webster).
	* <i>Clostrococcus cinctipennis</i> Ashm.	Girault, MS. notes, 1909, (R. L. Webster).

In the *Hymenoptera*, page 32 of the first part of the list, the following emendations have become necessary:

*Trichogramma minutum* and *T. pretiosum* read *Pentarthron minutum* (Riley) throughout. *Anagrus columbi* Perk. = *Armatus* Ashm.

Omit entirely *Isosoma* spp. and the parasites recorded from them. All of these parasites are doubtless from jassid eggs. See foregoing.

*Eriocampoides limacina* Retzius.—The parasite “Encyrtus” species is doubtless *Pentarthron minutum* (Riley), referred to thus by Peck (1799).

## LEPIDOPTERA.

HOST.	PARASITE.	AUTHORITY.
<i>Agraulis vanillæ</i> Linn.	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1910, (Bur. Ent.).
<i>Anisota senatoria</i> Smith and Abbot	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1910, (Bur. Ent.).
( <i>Archips</i> ) <i>Cacæcia rosea-ceana</i> Harris <sup>1</sup>	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1908.
<i>Carpocapsa pomonella</i> Linnæus	<i>Anaphes gracilis</i> How.	Girault, MS. notes, 1911, (U. S. N. M.).

HOST.	PARASITE.	AUTHORITY.
<i>Datana integerrima</i> Grote and Robinson	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1910, (Bur. Ent.).
<i>Diatraea saccharalis</i> Fabricius	<i>Pentarthron minutum</i> Riley	Koebele, 1908, p. 91. <sup>10</sup>
	Chalcidoid	Id. Ib., pp. 91-92.
<i>Euproctis chrysorrhæa</i> Linn.	<i>Telenomus phalænarum</i> Nees <sup>2</sup>	Howard, in Kirkland, 1907, p. 123.
	<i>Pentarthron minutum</i> Riley	Fiske, 1910.
	* <i>Pentarthron euproctidis</i> Girault <sup>11</sup>	Girault, MS. notes, 1910, (Bur. Ent.).
<i>Hemerocampa leucostigma</i> Smith and Abbot.	<i>Telenomus dalmani</i> Ratz	Brues, 1910, p. 107.
<i>Heterocampa guttivitta</i> Walker	<i>Telenomus graptæ</i> Howard	Fiske and Burgess, 1910, p. 390.
<i>Hyphantria textor</i> Harris	* <i>Pentarthron minutum</i> Riley	Girault, MS. notes, 1910, (Bur. Ent.).
<i>Malacosoma disstria</i> Hübner.	<i>Oöencyrtus clisiocampæ</i> Ashm.	Ashmead, 1900. <sup>1</sup>
<i>Meliana albilinea</i> Hübn.	<i>Pentarthron rctorridum</i> Girault	Girault, MS. notes, 1910, (R. L. Webster).
<i>Notolophus osleri</i> Barnes	<i>Telenomus coloradensis</i> Crawford	Crawford, 1909 <sup>1</sup> , pp. 206-207.
<i>Porthetria dispar</i> Linn.	<i>Schedius kuranæ</i> Howard <sup>2, 7</sup>	Howard, 1910, pp. 3-4.
	<i>Tyndarichus navæ</i> Howard <sup>2</sup>	Id. Ib. pp. 6-7. <sup>7, 8</sup>
	<i>Antatus bifasciatus</i> Fonscolombe <sup>2</sup>	Id. Ib., pp. 7-8. <sup>3, 7</sup>
	<i>Perissopterus jarensis</i> Howard	Id. Ib., pp. 11-12. <sup>7</sup>
	<i>Telenomus</i> new species	Id. Ib., p. 12. <sup>1</sup>
<i>Smerinthus astylus</i> Drury	<i>Anastatus pearsalli</i> Ashm.	Ashmead, 1898, p. 24.

### Corrections to Lepidoptera pages 32-35.

*Trichogramma pretiosum*, *T. intermedium*, *T. minutum*, *T. minutissimum* should read throughout *Pentarthron minutum* (Riley).

*Calpodes ethilius* Cramer—The "Trichogramma" species is *Pentarthron minutum* (Riley).

*Hemerocampa leucostigma* Sm. and Ab.—The parasites *Trichogramma fraternum* Fitch and *T. orgyiæ* Fitch are eulophids and not egg-parasites.

### NEUROPTERA.

HOST.	PARASITE.	AUTHORITY.
<i>Chauliodes rastricornis</i> Rambur.	<i>Pentarthron minutum</i> Riley	Needham and Betten, 1901, p. 547.

ODONATA.		
HOST.	PARASITE.	AUTHORITY.
<i>Lestes uncala</i> Kirby <i>L. unguiculata</i> Hagen <sup>3</sup>	<i>Brachistella acuminata</i> Ashm.	{ Ashmead, 1900 <sup>b</sup> . Needham, 1900. Needham, 1903, p. 230.
	<i>Centrobia odonata</i> Ashm.	
	<i>Polynema needhami</i> Ashm.	
	<i>Hyperteles polynemæ</i> Ashm. <sup>4</sup>	
	<i>Tetrastichus polynemæ</i> Ashm. <sup>5</sup>	
ORTHOPTERA.		
<i>Anazipha exigua</i> Say	<i>Polynema bifasciatipenne</i> Girault	Girault, 1908 <sup>a</sup> .
<i>Mantis</i> sp.	<i>Eupelmus brevicauda</i> Gahan	Gahan, 1910, p. 205.
<i>Oecanthus niveus</i> Deg. Geer	<i>Polynema bifasciatipenne</i> Girault	Girault, 1910, p. 255.
<i>Stagmomantis carolina</i> Linn.	<i>Eupelmus mantis</i> Ashm.	Ashmead, 1885, p. xv.
PLATYPTERA.		
<i>Cæcilius aurantiacus</i> Hagen	<i>Alaptus cæciliæ</i> Girault <sup>6</sup>	Girault, 1908 <sup>a</sup> , pp. 180, 181, 191.

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<sup>1</sup>Reared by Mr. J. J. Davis, Chicago, Ill. <sup>2</sup>Introduced artificially from Europe. <sup>3</sup>The rearing as recorded by Needham does not distinguish between the hosts, so it is taken for granted that the parasites are common to both. Ashmead merely gives *Lestes* species. Needham records at first five egg-parasites and one hyperparasite, whereas Ashmead records five from the egg of *Lestes* sp., but states *Hyperteles polynemæ* and *Tetrastichus polynemæ*, as their names indicate, to be parasitic on *Polynema needhami*, novel cases of secondary parasitism. Later, Needham changed the record to agree with that of Ashmead. <sup>4</sup>"Evidently a hyperparasite on the *Polynema* noted below." Ashmead, 1900, p. 616. <sup>5</sup>"Undoubtedly a hyperparasite of *Polynema needhami*." Ashmead, 1900, p. 616. <sup>6</sup>In England Enock (1897) records *Alaptus fuscus* Walker and a supposed male specimen of *A. minimus* Walker from the eggs of *Stenoposus cruciatus* (Linnaeus), a record overlooked in Girault, 1908<sup>b</sup>. <sup>7</sup>This is the first record of egg-parasites in the Platyptera. (See Girault, 1910, p. 244.) <sup>8</sup>Imported into Massachusetts from Japan. <sup>9</sup>Secondary on *Schedius*; cf. Howard. <sup>10</sup>*Pachyneuron gifucensis* Ashmead should be mentioned here as a secondary parasite of the *Schedius* and *Anastatus* and as tertiary upon the *Tyndarichus*. (Howard, l. c., p. 8). And also see *Atoposomoides ogima* Howard on the pages following (l. c.). <sup>11</sup>I have verified this record through specimens reared from the same host in North Carolina. <sup>12</sup>This is the *Trichogramma* sp. of Fiske (1910).

- (b) *Idem.* Some hymenopterous parasites from dragon-fly eggs. Ent. News, XI, pp. 615-617.
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- (a) Crawford, J. C. Proc. Ent. Soc. Washington, XI.
- (b) *Idem.* *Ibid.*
- (a) Girault, A. A. Psyche, XVI, pp. 106-107.
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## TWO NEW NAMES OF SPHECOID WASPS.

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The following two names purposed by Billberg in 1820 have generally been overlooked by Hymenopterists.

### GENUS AMMOBIA BILLBERG.

**Ammobia** Billberg, Enumartio Insectorum, 1820, p. 105.

Type.—*Pepsis argentata* Fabricius.

*Chlorion (Ammobia) umbrosum* (Christ.).

Syn.—**Proterosphex** H. Fernald. Ent. News, vol. 16, 1905, p. 165.

This genus was originally treated as follows (Eg. equals Billberg):

“G. **Ammobia** Eg.—*Amophila* Krb. Latr. Ed. cuc.—*Pepsis* Fbr. Spnl.—*Miscus* Jur.—*Sphex* Auct. coet.

* <i>Abdomine thorace duplo longiore</i>	{ <i>pratiosa</i>	Eg. 5.
	{ <i>sericea</i>	Ins. Mar. pacif. Fbr.
** <i>Abdomine longitudine thoracis</i>	{ <i>argentata</i>	His.—
	{ <i>arenaria</i>	Svec.—”

The first species included, *pratiosa* Billberg, is a nomen nudum.

The second species, *Pepsis sericea* Fabricius, is a variety of *Sphex* (F. F. Kohl) *aurulentus* occurring in the West Indies so probably was not before Billberg and should not be taken as the type.

The third species, *Pepsis argentata* Fabricius, is a common European species; is a synonym of *Sphex* (F. F. Kohl) *umbrous*, and may be chosen as the type of *Ammobia*.